

REMARKS

The Applicants appreciate the Examiner's thorough examination of the application and requests reexamination and reconsideration of the application in view of the following remarks.

Applicants amend claims 11 and 12 herein to more clearly define the invention. These amendments are not made for reasons related to patentability.

The Examiner maintains his rejection that claims 1-8 and 10-32 are anticipated by *Sauerland*. The Examiner also rejects claims 1, 18, 21, and 31 under 35 U.S.C. §102(b) as allegedly being anticipated by *Rutkoski*. The Examiner rejects claim 9 under 35 U.S.C. §103 as allegedly being unpatentable over *Sauerland*.

Sauerland discloses a quartz crystal frequency monitor that has little to do with a sensor whose resonant frequency is designed to change in response to mass as set forth in the instant application. In *Sauerland*, splitter 4, Fig. 1 delivers the source signal to phase detector 10 and quartz crystal resonator 16. The output of resonator 16 is also delivered to phase detector 10. In all cases, it is desired to obtain a phase detector output of zero indicating no phase difference across the resonator. See Col. 4, lines 4-40 of *Sauerland*.

Thus, there really is no output from resonator 16. Instead, when the phase across the resonator is zero, the signal frequency coincides with the resonator frequency. See *Sauerland* Col. 4, lines 13-15.

In sharp contrast, the subject application discloses a processing circuit (e.g., 104, Fig. 5) responsive to the output signal of sensor 12 and configured to detect resonant frequency *changes* from the flexural plate wave sensor *due to mass changes to measure mass loading as analytes load the sensor*. See the present specification, page 8, lines 17-18 and page 10, line 23 – page 11, line 5.

There is simply no teaching or suggestion in *Sauerland* regarding such a processing circuit since *Sauerland* relates solely to a quartz crystal resonator. *Sauerland* states:

In order to use the system for automatic frequency adjustment of resonators, the signal frequency is set to the desired resonator frequency and the detector output is set to zero, using a substitution resistor and the phase shifter. Then the substitution resistor is replaced by the resonator, and the frequency adjustment process is started. This process usually comprises decreasing or increasing the resonator electrode mass, for example, by vacuum metallization. When the resonator reaches the preset frequency, the phase detector output voltage becomes zero, and the power supply 42 of FIG. 4 is switched to terminal 44, from where it can be applied to automatically terminate the adjustment process.

Col. 4, lines 22-34. See also Col. 4, lines 40-54.

The Examiner states “*Sauerland* discloses resonant frequency is dependent on mass deposited on resonator electrode ... therefore the sensor may be used as a mass sensor.”

The reference to *Sauerland* at Col. 4, lines 22-46, however, is not a disclosure or suggestion of a mass sensor which measures mass loading. Instead, it relates to the *fabrication* of a quartz crystal resonator with a specific fixed resonating frequency in the first instance. That is why *Sauerland* is measuring the resonant frequency in the first place – to *set* the frequency of the resonator. See Col. 1, lines 3-8 of *Sauerland*. The frequency of the quartz crystal resonator can be changed by vacuum metalization to increase or decrease the resonator electrode mass. That, however, is not a disclosure or suggestion of a processing circuit responsive to the output signal of the resonator and configured to detect resonant frequency changes of the sensor due to mass changes in the field as analytes fall on the sensor.

In summary, the Applicants’ claimed system includes a flexure plate wave sensor which *measures* mass while in sharp contrast *Sauerland* discloses a method of tuning a quartz crystal resonator to have a specific resonant frequency by *changing* the mass of the quartz crystal

resonator and utilizing a substitution resistor in combination with a phase detector.

Rutkoski is similar to *Sauerland* in that *Rutkoski* teaches a quartz crystal resonator and a method and apparatus for measuring its frequency. There is no disclosure or suggestion in *Rutkoski* of processing circuit response to the output signal of a flexure plate wave sensor and configured to detect resonant frequency changes of the flexure plate wave sensor due to mass loading so that the flexure plate wave sensor can be used as a mass measurement device.

In each of Applicants' independent claims 1, 17, 18, 20, 21, 31, and 32, a processing circuit responsive to the output signal of the sensor (or a corresponding step in the appropriate method claims) has been added to make it clear that resonant frequency changes of the sensor due to mass changes are detected and processed to measure mass loading.

Therefore, it is believed that the Applicants' independent claims are clearly novel and non-obvious in light of *Sauerland* and *Rutkoski*. Accordingly, the Applicants respectfully request allowance of these amended claims and their respective dependent claims.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts at (781) 890-5678.

Respectfully submitted,

A handwritten signature in cursive script, reading "David W. Poirier". The signature is written in dark ink and is positioned above a horizontal line.

David W. Poirier
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